TWO NEW FISH ASSOCIATIONS WITH THE CARIBBEAN SEA ANEMONE, *CONDYLACTIS GIGANTEA*

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ABSTRACT: The rosy blenny, *Malacoctenus macropus,* and juvenile stages less than 2 cm in length of the bluehead wrasse, *Thalassoma bifasciatum,* were observed in close association with the Caribbean sea anemone, *Condylactis gigantea.* Larger juveniles and adult *Thalassoma,* however, do not associate with or seek the protection of these anemones. Both species of fish were able to swim among the tentacles of *Condylactis* apparently without being stung by nematocysts. When unmolested, both fish normally remain close to, but not among, the tentacles of the anemone.

SINCE the first description of the symbiotic relationship of certain fish with anemones in the China Sea by Collingwood (1863), associations of fish with anemones, as well as other cnidarians, have been widely reported (for review see Allen, 1972). These fish are able to swim unmolested among the tentacles of their hosts, while other fish are immediately stung by the nematocysts and ingested. The mechanisms proposed to account for the "immunity" of anemone fish vary and have been reviewed by Mariscal (1971). Certain fish of the genus *Amphiprion* possess a chemical factor associated with the epidermal mucus coat which prevents the discharge of the host anemone's nematocysts (Mariscal, 1970a). This factor is acquired through a behavioral mechanism during which the fish gradually becomes acclimated to the anemone. Fish separated from their hosts lose their protection and must reacquire it.

Association with anemones is primarily one which affords protection from predation for the fish. Anemone fish may feed off and benefit their hosts by removing necrotic tissue or organic waste material from the anemone's surface. Anemone fish have also been observed placing small bits of food on the tentacles (Mariscal, 1970d). On the other hand, *Amphiprion* has occasionally been observed to bite off and ingest small bits of the host's tentacles. Kato (1933) similarly reported that the small fish *Nomeus* will eat the tentacles and zooids of its siphonophore host *Physalia* and thus actually be harmful to a degree.

Reports of anemone fish have been mainly confined to Indo-Pacific regions and to the association of a gobiid fish, Gobius *bucchichii,* with the anemone, *Anemonia sulcata* in the Mediterranean Sea (Abel, 1960). Until very recently, such association have not been reported for Caribbean species. In 1973, however, Smith reported the relationship of the blenny, *Labrisomus kalisherae,* with the anemone *Concylactis gigantea* along the Caribbean coast of Panama. Colin and Heiser (1974) observed large numbers of cardinal

Carib. J. Sci. 16 (l-4). 1980

fish, *Apogon quadris-quamatus* and *A. aurolineatus,* associated with the anemones *Condylactis gigantea* and *Bartholomew annulatas, at* Discover Bay, Jamaica and of *A. quadrisquamatus* with *Bartholomew* at Curaçao, Netherlands Antilles. Cardinal fish were reported to be frequently stung by the anemones, however.

We wish to report two additional species of Caribbean fish observed to associate with the anemone *Condylactis gigantea.* These are the rosy blenny, *Malacoctenus macropus (Family,* Clinidae), and the juvenile stage of the bluehead wrasse, *Thalassoma bifasciatum* (Family, Labridae). To our knowledge, this is the first report of a labrid fish associated with an anemone. Observations were made for 10 consecutive days with snorkle and SCUBA gear on anemones living in the lagoon *Thallasia* grass beds off Long Cay, on Glover's Reef, British Honduras. Of the 100 anemones initially screened for symbionts, five harbored rosy blennies and four possessed juveniles of the bluehead wrasse. These associations were fairly stable as the same anemones harbored apparently the same fish throughout the observation period. All observations were made in 3-8 feet of water.

As reported for the blenny *Labrisomus* (Smith, 1973), *Malacoctenus* was normally found at the base of the anemone, often under an umbrella of tentacles. When approached from one direction, the fish would retreat to the opposite side of the anemone, often swimming through the tentacles but never resting within them or on the oral disc. Only on one occasion was the tentacles observed to stick via nematocyst discharge to the surface of a fish. This contact was easily broken by the fish which made no attempt to leave its immediate environment. Blennies seemed to have favorite resting sites at the bases of anemones and repeatedly returned to these locations when undistributed. If the anemone was located on an empty shell or piece of coral rubble, these locations were invariably small crevices or holes near the pedal disc.

Occasionally, blennies would wander several feet from the host anemone. If they were a short distance away, perhaps 1-2 feet, when frightened, they would immediately return to their host. At greater distances, or when return to the anemone was prevented, they would seek protection in the nearest empty shell or patch of coral rubble. If left undisturbed they would eventually return to the anemone.

In the case of the bluehead wrasse *Thalassoma,* an interesting situation was observed. It appeared that only very small individuals (1 1 /2-2 cm in length) associated with *Condylactis.* Similarly, Dahl (1961) reported that only young whiting, *Gadus merlangus,* live in association with the jellyfish, *Cyanea capillata.* Juvenile wrasse were normally observed swimming just above the sphere of tentacles. When frightened by a diver, they would immediately dive among the tentacles, swimming through them quite close to the oral disc. The tentacles were never seen to stick to the fish though tentacle contact with the body and fins must have been frequent. If hard pressed, juveniles would swim to other nearby anemones and, in one instance, among the spines of the sea urchin, *Diadema antillarum.*

Juveniles of larger size, while relatively numerous, did not associate with anemones or seek protection among the tentacles when frightened. It would be interesting to determine if older juveniles lose their protection from anemones or whether protection by the anemone is no longer necessary. Adults were not seen in the *Thallasia* grass beds but were common in the nearby coral reefs. The association of very young juveniles with *Condylactis* in the grass beds may thus serve to decrease predation on very young fish by reef and grass bed predators.

At no time were juveniles observed to pick at the surface of anemones or to feed on fish captured by them. As adult *Thalassoma bifasciata* have been reported to occasionally clean other fish of parasites (Feddern, 1965), further and more extensive observations are necessary, in this regard, for young juveniles.

ACKNOWLEDGEMENTS

This work was a result of the Tropical Studies Program sponsored and supported by the Associated Universities for International Education. We wish to thank Dr. David Greenfield for his and in the identification of fish.

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